7. (Once Amended Herein) A method of cleaning a semiconductor processing equipment, said method comprising:

introducing a first precursor to a dissociator;

dissociating said first precursor to create a first plurality of radicals;

introducing a first portion of said first plurality of radicals to said equipment, a second portion of said first plurality of radicals re-associating to create less reactive elements;

introducing said less reactive elements to said equipment;

dissociating said less reactive elements to form a second plurality of radicals in said equipment;

introducing a second precursor into said equipment, wherein said second precursor bypasses said dissociator; and

using the first and second portions of the first plurality of radicals and constituents of the second precursor to clean the equipment.

A1 Cont'd

8. (Once Amended Herein) The method of claim 7, wherein said dissociating said first precursor provides at least 75% dissociation efficiency, whereby PFCs in an exhaust from said system equipment are reduced.

9. (As Filed) The method of claim 7, wherein said second portion of said first plurality of radicals is greater than said first portion of said first plurality of radicals.

10. (Once Amended Herein) The method of claim 9, wherein said first precursor comprises a fluorinated species capable of supplying atomic fluorine.

11. (As Filed) The method of claim 7, wherein said second plurality of radicals includes cleaning ions.

12. (As Filed) The method of claim 11, wherein said cleaning ions include at least one of F ions or Cl ions.

13. (As Filed) The method of claim 7, wherein said dissociating said less reactive elements creates physical sputtering.

14. (As Filed) The method of claim 7, wherein said less reactive elements include at least one of F_2 or Cl_2.

Please cancel claim 15 without prejudice.

16. (Once Amended Herein) The method of claim 7, wherein said second precursor comprises oxygen.

A1 Cont'd

17. (As Filed) The method of claim 16, wherein said oxygen combines with carbon on said equipment to form CO_y.

18. (As Filed) A method of cleaning a semiconductor processing equipment, said method comprising:

introducing a first precursor to a remote dissociator;

dissociating said first precursor to create a first plurality of radicals;

introducing said first plurality of radicals to said equipment;

introducing a second precursor to said remote dissociator;

dissociating said second precursor to create a second plurality of radicals;

introducing a first portion of said second plurality of radicals to said equipment, a second portion of said second plurality of radicals re-associating to create less reactive elements;

introducing said less reactive elements to said equipment; and

dissociating said less reactive elements to form a third plurality of radicals in said equipment.

19. (Once Amended Herein) The method of claim 18, wherein said third plurality of radicals comprise Cl F and said first plurality of radicals comprise F.

20. (As Filed) The method of claim 18, wherein said dissociating said first precursor includes forming a first plasma and said dissociating said less reactive elements includes forming a second plasma.

21. (Once Amended Herein) A semiconductor equipment cleaning system comprising:

a housing;

a remote dissociator configured to dissociate a first gas remote from said housing, said dissociation forming a second gas;

a gas delivery system to introduce a portion of said first gas, a portion of said second gas, and a re-associated portion of said second gas into said housing.

a local dissociator configured to dissociate said re-associated portion of said second gas;

a controller for controlling said remote dissociator, said gas delivery system, and said local dissociator; and

a memory coupled to said controller, said memory comprising a computer-readable medium having a computer-readable program embodied therein for directing operation of said semiconductor cleaning system, said computer-readable program comprising:

instructions directing said remote dissociator to dissociate said first gas and a third gas;

an instruction to control said gas delivery system; and

an instruction directing said local dissociator and said remote dissociator to dissociate a re-associated portion of said second gas.

A1 Contd

Please cancel claim 22 without prejudice

23. (Added Herein) A method for cleaning a deposition chamber, the method comprising:

delivering a first precursor gas and a second precursor gas into a remote dissociator;

dissociating at least part of the first precursor gas in the remote dissociator, wherein a first plurality of radicals are formed;

dissociating at least part of the second precursor gas in the remote dissociator, wherein a second plurality of radicals are formed;

flowing a first portion of the first plurality of radicals into the deposition chamber, wherein the first portion of the first plurality of radicals react to clean the deposition chamber;

A1 Cont'd

flowing a second portion of the first plurality of radicals into the deposition chamber, wherein the second portion includes radicals associated to form less reactive elements;

flowing a portion of the second plurality of radicals into the deposition chamber, wherein the portion of the second plurality of radicals react to clean the deposition chamber; and

dissociating at least part of the less reactive elements in the deposition chamber, wherein the dissociated less reactive elements react to clean the deposition chamber.

24. (Added Herein) The method of claim 23, wherein the first precursor gas is the same as the second precursor gas.

25. (Added Herein) The method of claim 23, wherein the first precursor gas comprises fluorine, and the second precursor gas comprises chlorine.

26. (Added Herein) The method of claim 23, wherein dissociating at least part of the less reactive elements in the deposition chamber is performed prior to flowing a portion of the of the second plurality of radicals into the deposition chamber, and wherein dissociating the second precursor gas is performed exclusively in the remote dissociator.

27. (Added Herein) The method of claim 23, wherein dissociating at least part of the less reactive elements in the deposition chamber is performed after flowing a portion of the of the second plurality of radicals into the deposition chamber,

28. (Added Herein) A method for cleaning a deposition chamber contaminated with carbon and silicon based contaminants, the method comprising:

delivering NF_3 gas into a remote dissociator;

dissociating at least part of the NF_3 gas in the remote dissociator, wherein fluorine radicals are formed;

flowing a first portion of the fluorine radicals into the deposition chamber;

flowing a second portion of the fluorine radicals into the deposition chamber, wherein the second portion includes fluorine radicals associated to form less reactive elements;

dissociating at least part of the less reactive elements in the deposition chamber to form additional fluouine radicals, wherein the fluorine radicals react with the silicon based contaminants on the deposition chamber; and

flowing oxygen into the deposition chamber, wherein the oxygen reacts with the carbon based elements in the chamber.

A1 Cont'd

29. (Added Herein) The method of claim 28, wherein the silicon and carbon based contaminants comprise a BLO_K residue.

30. (Added Herein) The method of claim 29, wherein the BLO_K residue reacts with the fluorine radicals to form SiF_x, and with the oxygen to create CO_y.

31. (Added Herein) The method of claim 28, wherein the oxygen is at least partially dissociated to create oxygen radicals.

32. (Added Herein) The method of claim 28, wherein the carbon and silicon based contaminants are residue from deposition of an SiC material performed in the deposition chamber during a preceding deposition process.

33. (Added Herein) A computer-readable storage medium having a computer-readable program embodied therein for directing operation of a semiconductor cleaning system, said semiconductor cleaning system comprising an equipment, a remote dissociator, a local dissociator, and a gas delivery system configured to introduce a gas from said remote dissociator into said equipment, said computer-readable program including instructions for operating said semiconductor cleaning system in accordance with the following:

A1 cont'd

delivering a first precursor gas and a second precursor gas into the remote dissociator;

dissociating at least part of the first precursor gas in the remote dissociator to form a first plurality of radicals;

dissociating at least part of the second precursor gas in the remote dissociator to form a second plurality of radicals; and

dissociating less reactive elements in the local dissociator, wherein the less reactive elements are formed from a portion of the first plurality of radicals that combine in the gas delivery system.

CONCLUSION

In view of the foregoing, Applicants believe all claims now pending in this Application are in condition for allowance. If the Examiner believes a telephone

conference would expedite prosecution of this application, please telephone the undersigned at 303-571-4000.

Respectfully submitted,

Douglas M. Hamilton
Reg. No. 47,629

TOWNSEND and TOWNSEND and CREW LLP
Tel: (303) 571-4000
Fax: (303) 571-4321
DMH:sbm
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